Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

THREE SENSORS DIRECTORATE RESEARCH SCIENTISTS RECEIVE 2003 PIONEER AWARD

The Pioneer Award is the highest award presented by the Aerospace & Electronic Systems Society (AESS) of the Institute of Electrical and Electronics Engineers (IEEE). The IEEE bestows this award to individuals who made contributions 20 years ago to systems still in existance. SAR systems, based on the work of the 2003 Pioneer Award winners, are now operational in numerous Air Force combat aircraft.

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Accomplishment

The AESS of the IEEE presented the 2003 Pioneer Award to three research scientists associated with the Sensors Directorate for their technical contributions and leadership roles in establishing fine-resolution Synthetic Aperture Radar (SAR). The recipients were Wright Laboratory's Sensors Directorate Chief Scientist Dr. William M. Brown (left); Mr. William R. (Russ) Boario (center), retired from Avionics Laboratory; and Dr. Jack L. Walker (right), retired from Environmental Research Institute of Michigan (ERIM). ERIM was the successor organization to Willow Run Laboratories (WRL) at the University of Michigan.

Background

In 1960, when Dr. Brown became head of the Radar and Optics Laboratory at WRL, he committed his research team to improving SAR resolution from 100 ft to better than 1 ft. By the late 1960s, the state of the art was 5 ft, and the major challenge was to coherently process data over long time intervals during which points in the target field moved (relative to the radar) through many range and cross-range resolution cells. Dr. Brown conceived and demonstrated a concept that circumvented this problem. The basic idea recorded and processed the range dimension in the Fourier transform domain rather than in the usual time-delay variable.

From the 1950s into the 1970s, Mr. Russ Boario led Air Force research and development efforts in SAR systems. He sponsored and collaborated with the WRL, where focused SAR was first demonstrated. Within the Air Force and Department of Defense, Mr. Boario established advocacy and maintained funding for fine-resolution SAR programs.

As a technical leader at ERIM, Dr. Walker went on to establish Spotlight SAR with polar format processing in the Fourier transform domain. He extended and perfected the theory, conducted definitive ground-based demonstrations, and designed and completely specified an airborne system. In addition, he managed the Air Force-sponsored program that fully demonstrated the technical performance and high military utility of spotlight-mode SAR that had better than 1 ft resolution. The first successful flights were conducted at ERIM in 1974.

Sensors
Awards and Recognition

Additional information

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